NOTICE

All drawings located at the end of the document.

the East Chiller Cooling Water (Glycol mix) System. Cooling Tower 4 (Building 784) consists of four units and is the Standby Cooling Water System (Appendix B).

IHSS 138 is related to two separate releases from the cooling towers for Building 779 that occurred 14 years apart (DOE, 1992b). The first is a piping leak that occurred on December 8, 1976 in an underground line that connected to the original cooling towers and the second is related to an overflow event that occurred on December 8, 1990. Both events are described below.

Utilities personnel at RFP recalled that the 1976 spill occurred when an underground water line for a cooling tower broke east of Building 779 and adjacent to the northwest corner of Building 727. The leak discharged approximately 400 gallons of cooling tower effluent into a storm sewer. At the time, it was stated that the spill drained toward Trench No. 6, which was part of the original surface-water and shallow groundwater collection system north of the solar ponds (Appendix B).

The second event occurred on December 8, 1990 when a sump filled and water backwashed into Building 785 (Cooling Tower No. 2) and spilled out of the fan on the east side of the structure. An estimated 1,000 gallons of cooling tower water flowed onto the ground. According to Building 779 utilities personnel, the spray from the backwash extended no more than 5 to 6 feet east of the building (Appendix B).

IHSS 138 was originally defined as a 75- by 75-foot area northeast of Building 779 (EG&G, 1990c). The area of the cooling tower water line break is of smaller extent and located farther to the east than presented in the IAG as IHSS 138. It was proposed that IHSS 138 be redefined as a 50- by 50-foot area north of Building 727 (DOE, 1992b). The IHSS boundary presented in the IAG was concluded to be too large and too far west of where the 1976 event occurred. The reidentification of the site in the HRR is considered to be adequate for the 1976

A-OU08-000073

of detectable concentrations for a given constituent for the calculation of tolerance intervals, the Background Geochemical Characterization Report provides the maximum detected value. The analytical data obtained for OU8 were compared to the upper tolerance limit (or both upper and lower tolerance limits for pH) or the maximum detected concentration for each parameter to determine if the concentration exceeded background. In addition, when the upper tolerance limit was exceeded the concentrations were compared to the maximum concentration detected in background samples as an additional indicator of whether the concentration detected may be ~~evidence of a release to the environment. When the pH of a sample was greater than the upper~~ tolerance limit or less than the lower tolerance limit it was also compared to the range of background values. **Base on experience including OU 1, it is apparent that professional judgement must be utilized in background comparison issues whether inferential (e.g. hypothesis testing) or comparative as this case is comparative. The environmental science literature is filled with reference to the variability in natural materials. For example, Dragun (1988) cites the typical range of copper as 2.0 to 100 mg/kg (a two order of magnitude spread) and the extreme limits as 0.1 to 14,000 mg/kg (a six order of magnitude spread). As a result of such varability that is not always captured and expressed, information in the Background Geochemistry Report must not be used without perspective. This would include: qualification as the history of the data, its statistical veracity relative to the application, and its position with respect to the published natural variation. An additional consideration for a data user is the data's conformance to the principles of data qulity objectives, and the PARCC parameters (Precision, Accuracy, Representativeness, Completeness, and Comaparability) as discussed in Guidance (EPA, 1987a).**

Background data for media relevant to the discussion of the nature and extent of contamination associated with OU8 are summarized in Tables 2.3 to 2.6. For the purposes of this discussion, analytical data for surficial materials identified as artificial fill on borehole logs were compared to background data for North Rocky Flats Alluvium. Regardless of whether borehole logs

South of Building 779; IHSS 150.8 - Radioactive Site Northeast of Building 779; IHSS 151 - Fuel Oil Leak - Tank 262 North of Building 347; IHSS 163.1 - Radioactive Site North of Building 774; IHSS 163.2 - Radioactive Site North of Buildings 771 & 774; IHSS 172 - Central Avenue Waste Spill; IHSS 173 - Radioactive Site - 900 Area (Storage Vaults Near Building 991); IHSS 184 - Radioactive Site - Building 991 Steam Cleaning Area (near Building 992); and IHSS 188 - Acid Leak (Southeast of Building 374). Figure 2-37 presents a schematic diagram of the conceptual model for Group III.

2.5.3.3.1 Contaminant Sources and Release Mechanisms

Primary Sources and Release Mechanisms

IHSS 118.2 - Solvent Spill South End of Building 776 (IAG Name: Multiple Solvent Spills (South End of Building 776)

A 5,000-gallon above-ground carbon tetrachloride tank located within a bermed area between the north side of Building 707 and the alleyway south of Building 778 is believed to be the primary source of contamination at this site.

This tank is known to have ruptured and leaked solvent onto the ground, which contaminated the soil. An unknown amount of carbon tetrachloride was released. The tank and the area of the spill were cleaned up. No documentation was found that further details response to this occurrence.

IHSS 118.2 was originally defined as a 30- by 70-foot area south of Building 776 (EG&G, 1990c). The HRR more precisely located this IHSS between the north side of Building 707 and the alleyway south of Building 778. More recent information provided by Doty & Associates (Appendix B) indicates that IHSS 118.2 be redefined as an area approximately 30 by 20 feet adjacent to the north side of Building 707 (Figure 2-4). The area occupies part of the long, narrow alley between Buildings 707 and 778.

IHSS 139.1 (N) and (S) - Hydroxide Tank Area - Buildings 771 and 774 (IAG Name: Caustic Acid Spills)

The primary source of contamination at IHSS 139.1 is considered to be two caustic tanks, a 5,400-gallon KOH tank south of Building 771, and a 6,500-gallon NaOH tank north of Building 774. The KOH tank is located approximately 55 feet south and 35 feet east of the southeast corner of Building 771.

The primary release mechanisms at this IHSS are leaks, spills, and overflows. In several incidents spills occurred during the routine filling of the caustic tanks near Building 771. Neither the specific tanks nor the quantities involved have been thoroughly documented. In several of the instances, the spilled caustic was contained by a dike below the tank, and was not released to the environment. Some small leaks have been noted in the piping from the NaOH tank at Building 774. Some leaks that have been documented indicate seepage along the underground pipe to the outside of the building.

IHSS 139.2 - Hydrofluoric Acid Tank Area- Building 714 (IAG Name: Caustic/Acid Spills)

The primary sources of contamination at this IHSS are considered to be two horizontal, 1,300-pound HF cylinders, each with a 1,200-pound capacity. They are located in Building 714, a small shed approximately 4 feet east and 29 feet south of the southeast corner of Building 771.

The primary release mechanism at this IHSS is leakage. A small vapor release from the HF connection outside Building 771 and an HF leak above Building 771 have been noted.

14 sample locations, collection of 4 vertical soil profile (VSP) samples, collection of surface soil samples, and implementation of a soil-gas survey. The surface soil sample collection and soil-gas survey will be conducted on a 50-foot grid, resulting in 9 sample locations (Figure 6-7). The surface soil samples will be analyzed for nitrate, Ph, fluoride, and TAL metals; the soil-gas survey will analyze for the compounds of interest listed on Table 6.2.

Stage 3 may include additional surficial soil sampling and will include the installation of soil ~~boring(s) and collection of groundwater samples via the BAT, if groundwater is encountered.~~ TM 2 will specify the number and location of soil borings to be drilled. Additionally, TM 2 will specify the analyses required for the soil and groundwater samples collected in the soil borings. Also, soil samples will be collected from the soil borings for analysis of geophysical and geochemical properties as described in Section 6.4.4.2. TM 3 will provide the basis for any additional sampling that may be required beyond Stage 3 sampling.

6.5.4 Cooling Tower Blowdown (IHSS 135)

IHSS 135 consists of a containment pond and connecting drainage that was affected by cooling tower blowdown water. This water may have contained phosphates, chromate, and tritium.

Stage 1 activities as described in Section 6.4.1 will be performed as required to enhance subsequent stage investigations.

Stage 2 investigations will include collecting surficial soil samples on a 50-foot grid, resulting in 5 sample locations (Figure 6-8). These samples will be analyzed for total chrome and tritium.

Stage 3 may include additional soil sampling and will include the installation of soil boring(s) for confirmation and/or assessment of nature and extent of contamination and collection of groundwater samples via the BAT, if groundwater is encountered. TM 2 will specify the number and location of soil borings to be drilled. Additionally, TM 2 will specify the analyses required for the soil and groundwater samples collected in the soil borings. If soil borings are installed, it is currently proposed that the soil and groundwater samples be analyzed for chrome and possibly tritium. Also, soil samples will be collected from the soil borings for analysis of geophysical and geochemical properties as described in Section 6.4.4.2. TM 3 will provide the basis for any additional sampling that may be required beyond Stage 3 sampling.

6.5.5 Cooling Tower Blowdown (IHSS 137)

The ground surface between and surrounding Buildings 712 and 713 has been impacted by cooling tower water from drift, blowdown, and leaks. Chromates and phosphates have been added to this water as algicides and rust and corrosion inhibitors.

Stage 1 activities such as document review and site visits will be performed as required to enhance subsequent stage investigations.

Stage 2 investigations will include collection of surface soil samples on a 50-foot grid, resulting in 7 sampling locations (Figure 6-5). Surface soil samples will be analyzed for total chromium.

Stage 3 investigations may include additional surficial soil sampling and will include the installation of soil borings for confirmation and/or assessment of nature and extent of contamination and collection of groundwater samples via the BAT. if groundwater is encountered. TM 2 will specify the number and location of soil borings to be drilled. Additionally, TM 2 will specify the analyses required for the soil and groundwater samples collected in the soil borings. It is currently proposed that soil and groundwater samples be analyzed for total chromium. Also, soil samples will be collected from the soil borings for

Dragun, 1988: Dragun, J., 1988, The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, Silver Spring, MD.

EG&G, 1990a: EG&G Rocky Flats, Inc., "Wetlands Assessment, Rocky Flats Site Revision C," 1990.

EG&G, 1990b: EG&G Rocky Flats, Inc., "Background Geochemical Characterization Report, Rocky Flats Plant for 1989": Prepared for the U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado, 6 sections, 34 figures, 81 tables, 3 plates, and Appendices A through D, December 21, 1990.

EG&G, 1990c: EG&G Rocky Flats, Inc., "First Draft Phase I RFI/RI Work Plan, Operable Unit No. 5": Prepared for U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado, 7 sections, 7 figures, 6 tables, 2 plates, Appendices A-E, July, 1990.

EG&G, 1991a: EG&G Rocky Flats, Inc., "Quality Assurance Project Plan for CERCLA Remedial Investigations and Feasibility Studies and RCRA Facility Investigations and Corrective Measures Studies Activities," Environmental Restoration Program, 1991.

EG&G, 1991b: EG&G Rocky Flats, Inc., "EG&G Rocky Flats General Radiochemistry and Routine Analytical Services Protocol, Parts A & B (GRRASP)," Environmental Management Department, 1991.

EG&G, 1991c: EG&G Rocky Flats, Inc., "Draft Final Geologic Characterization Report," with Appendices, July 31, 1991.

EG&G, 1991d: EG&G Rocky Flats, Inc., "Surface Water and Sediment Monitoring Plan," Environmental Restoration Program, 81 p., 5 figures, 10 tables, and 2 plates, February 15, 1991.

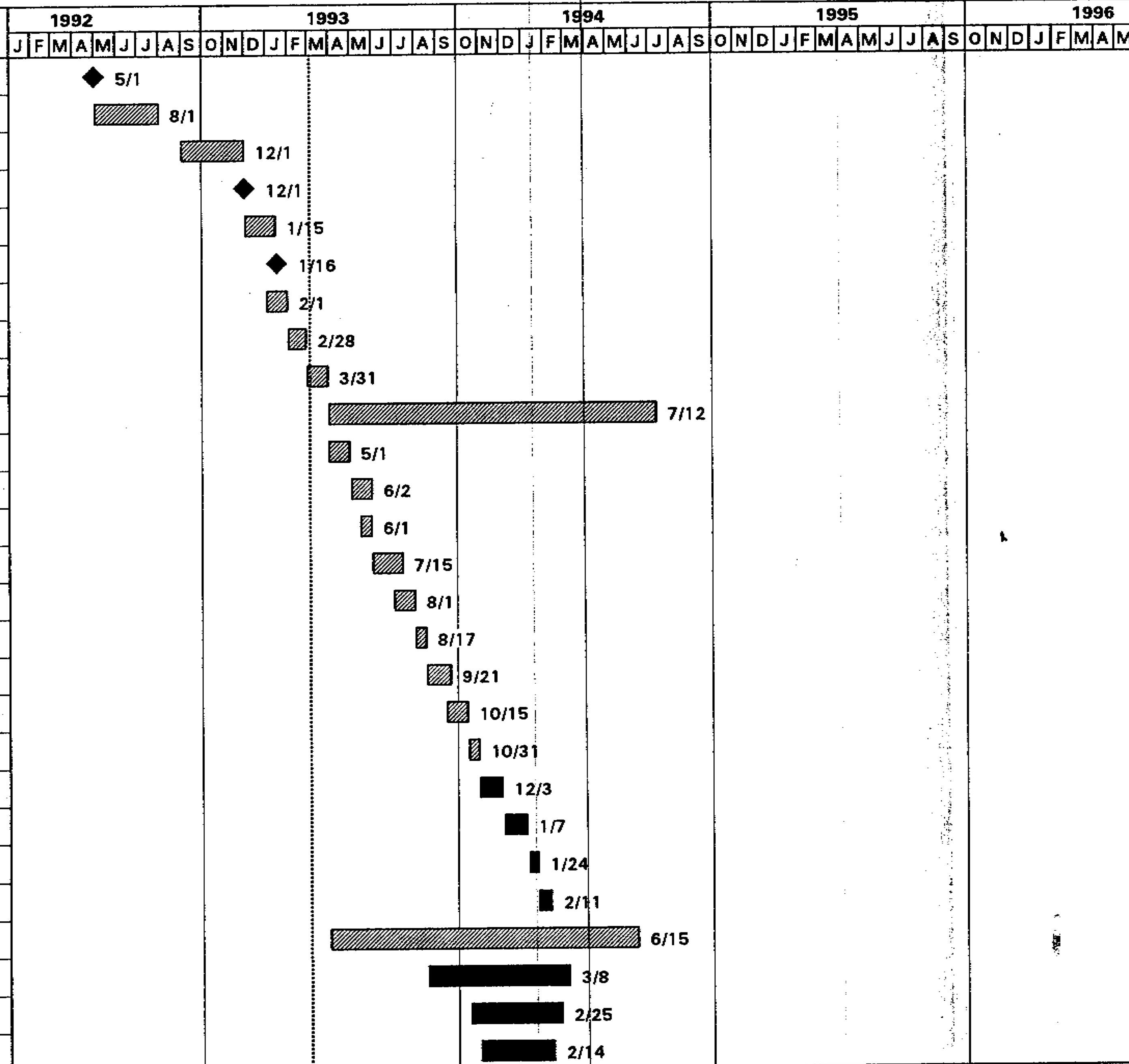
EG&G, 1991e: EG&G Rocky Flats, Inc., "Radiological Guidelines Manual," No. 3-21000-SOPS-EMRG, Environmental Management Department, 1991.

EG&G, 1991f: EG&G Rocky Flats, Inc., "Draft, Rocky Flats Surface Water Management Plan," Prepared for U.S. Department of Energy, Rocky Flats Area Office, Volumes I and II, March 1991.

EG&G, 1991g: EG&G Rocky Flats, Inc., "Final Groundwater Protection and Monitoring Program Plan for Rocky Flats Plant," in compliance with DOE Order 5400.1, 9 sections, 1 plate, 31 figures, 20 tables, and Appendices A through E, November 27, 1991.

Final OU 8 RFI/RI Work Plan and Field Implementation Schedule

ID	Name	
1	Submit Draft Phase I Workplan	5/1
2	EPA/CDH Review of Workplan	8/1
3	Prepare Final Phase I Workplan	12/1
4	Submit Final Phase I Workplan	12/1
5	EPA/CDH Review of Final Phase 1 Work Plan	1/15
6	EPA/CDH Approval of Final Workplan	1/16
7	Prepare Project Mgmt. Plans (PMP)	2/1
8	EG&G/RFP/DOE Review & Approval (PMP)	2/28
9	Field Mobilization	3/31
10	Implement Community Relations	7/12
11	Implement Stage 1 Field Sampling Plan	5/1
12	Pepare Technical Memorandum 1 (TM1)	6/2
13	EPA/CDH Review TM1	6/1
14	Implement Stage 2 Field Sampling Plan	7/15
15	Prepare Technical Memorandum 2 (TM2)	8/1
16	EPA/CDH Review TM2	8/17
17	Implement Stage 3 Field Sampling Plan	9/21
18	Prepare Technical Memorandum 3 (TM3)	10/15
19	EPA/CDH Reveiw TM3	10/31
20	Implement Stage 4 Field Sampling Plan	12/3
21	Prepare Technical Memorandum 4 (TM4)	1/7
22	EPA/CDH Reveiw TM4	1/24
23	Implement Stage 5 Field Sampling Plan	2/11
24	Data Validation	6/15
25	Conduct Risk Assessment	3/8
26	Corrective Measurse Study/Feasibility Study	2/25
27	Prepare Draft Phase I Report	2/14



Final OU 8 RFI/RI Work Plan and Field Implementation Schedule

ID	Name	Schedule (1992–1996)
28	Submit Draft RFI/RI Phase I Report	2/14
29	EPA, CDH, LRA Review of Draft RFI/RI Report	3/28
30	Prepare Final RFI/RI Phase I Report	7/12
31	Submit Final RFI/RI Phase I Report	7/12

Dragun, 1988: Dragun, J., 1988, The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, Silver Spring, MD.

EG&G, 1990a: EG&G Rocky Flats, Inc., "Wetlands Assessment, Rocky Flats Site Revision C," 1990.

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EG&G, 1991b: EG&G Rocky Flats, Inc., "EG&G Rocky Flats General Radiochemistry and Routine Analytical Services Protocol, Parts A & B (GRRASP)," Environmental Management Department, 1991.

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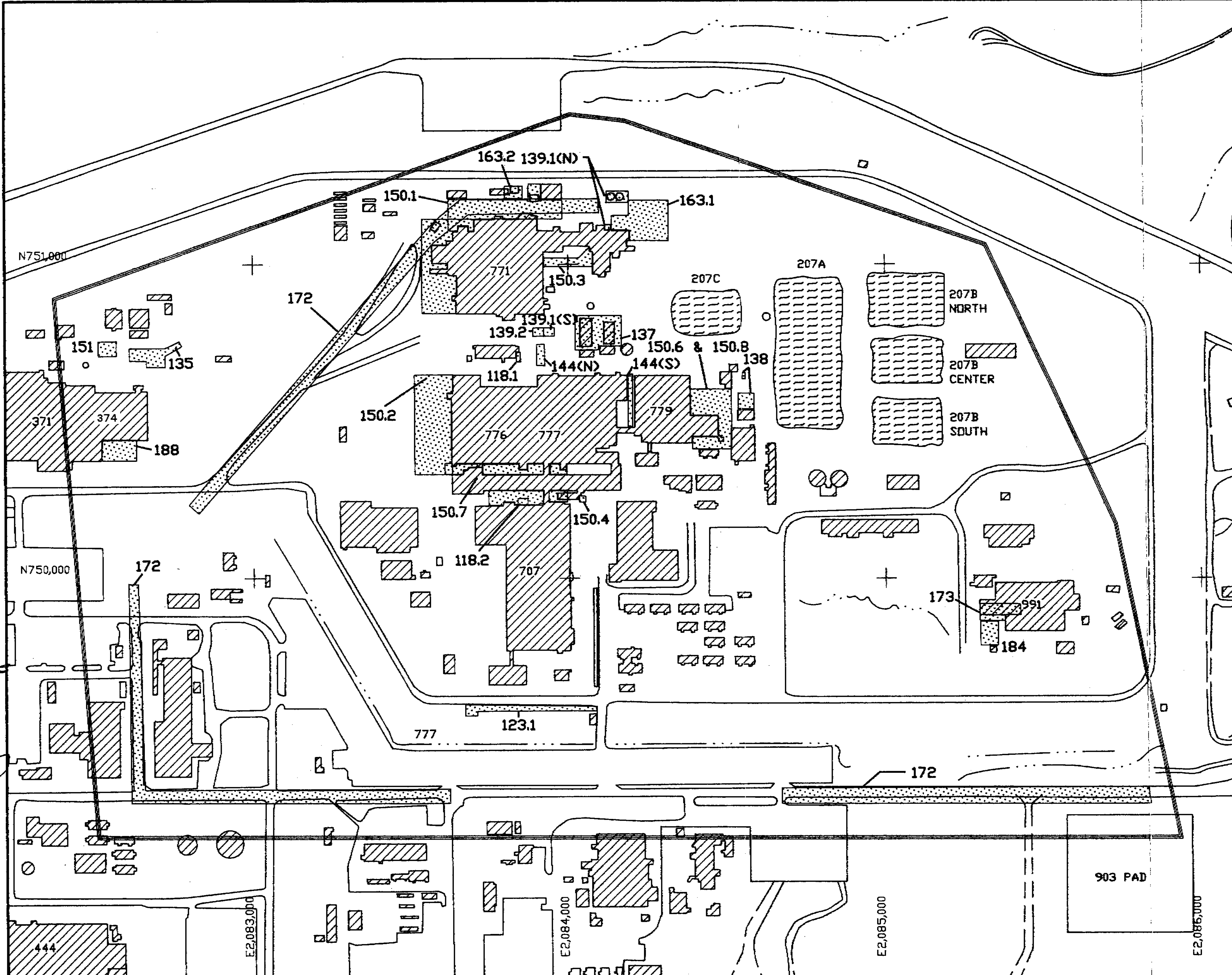

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MAP LEGEND

OPERABLE UNIT 8

STREAMS DITCHES DRAINAGE FEATURES

PAVED ROADS

DIRT ROADS

SURFACE WATER IMPOUNDMENTS

BUILDINGS

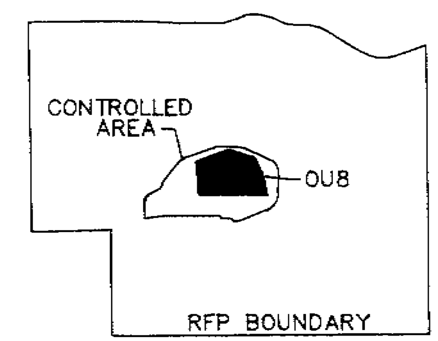
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

-N-

SCALE IN FEET

0 300 600

Source: Groundwater Protection and Monitoring Program Plan. ASI Nov. 1991



U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden Colorado

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

FIGURE 2-2

LOCATION OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES OPERABLE UNIT 8 700 AREA

Approved By [signature] Date 11/20/92

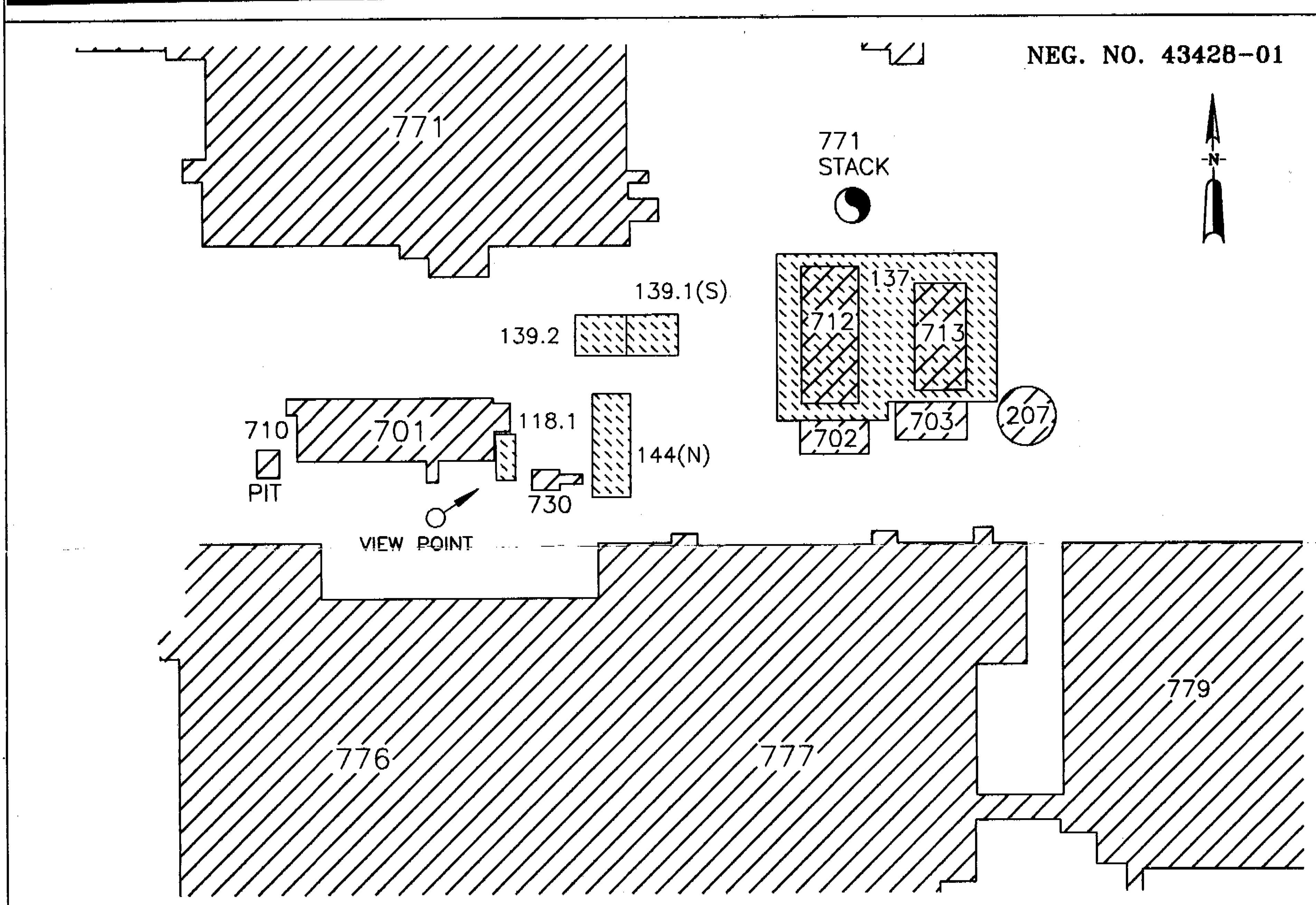


FIGURE 2-3

IHSSs 118.1, 137, 139.1(S), 139.2, and 144(N)

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

NEG. NO. 43969-03

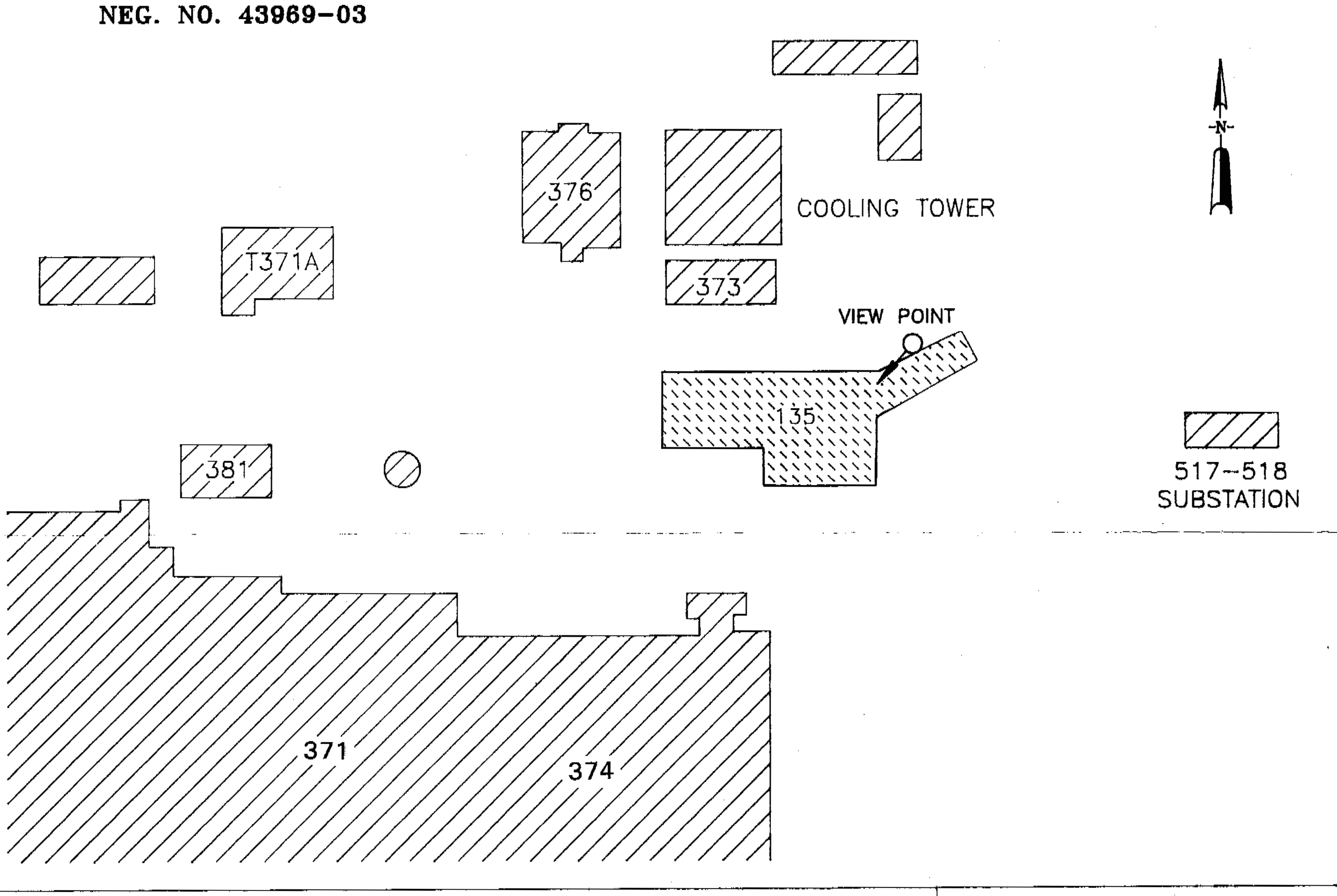


FIGURE 2-6

IHSS 135

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

NEG. NO. 43430-06

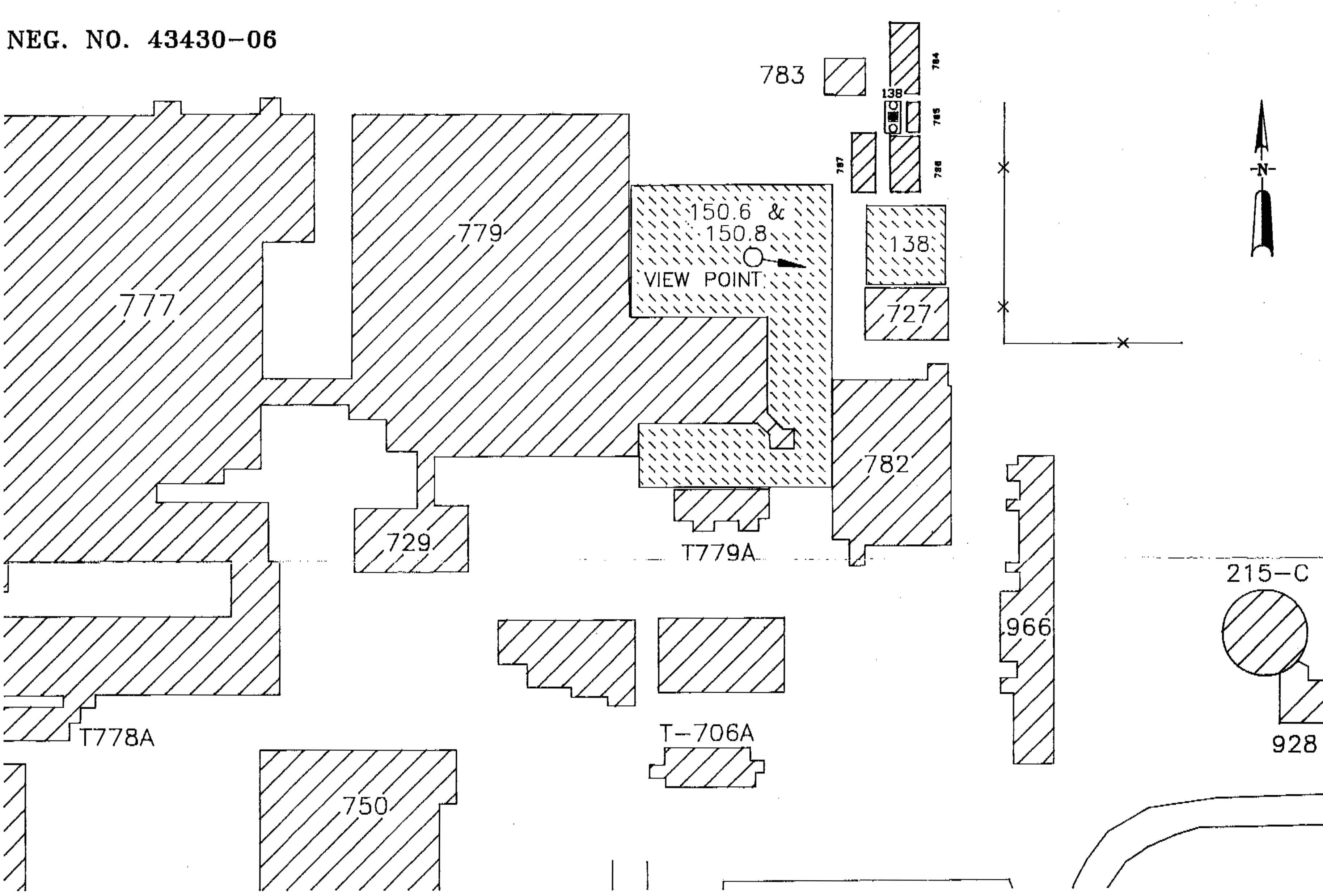
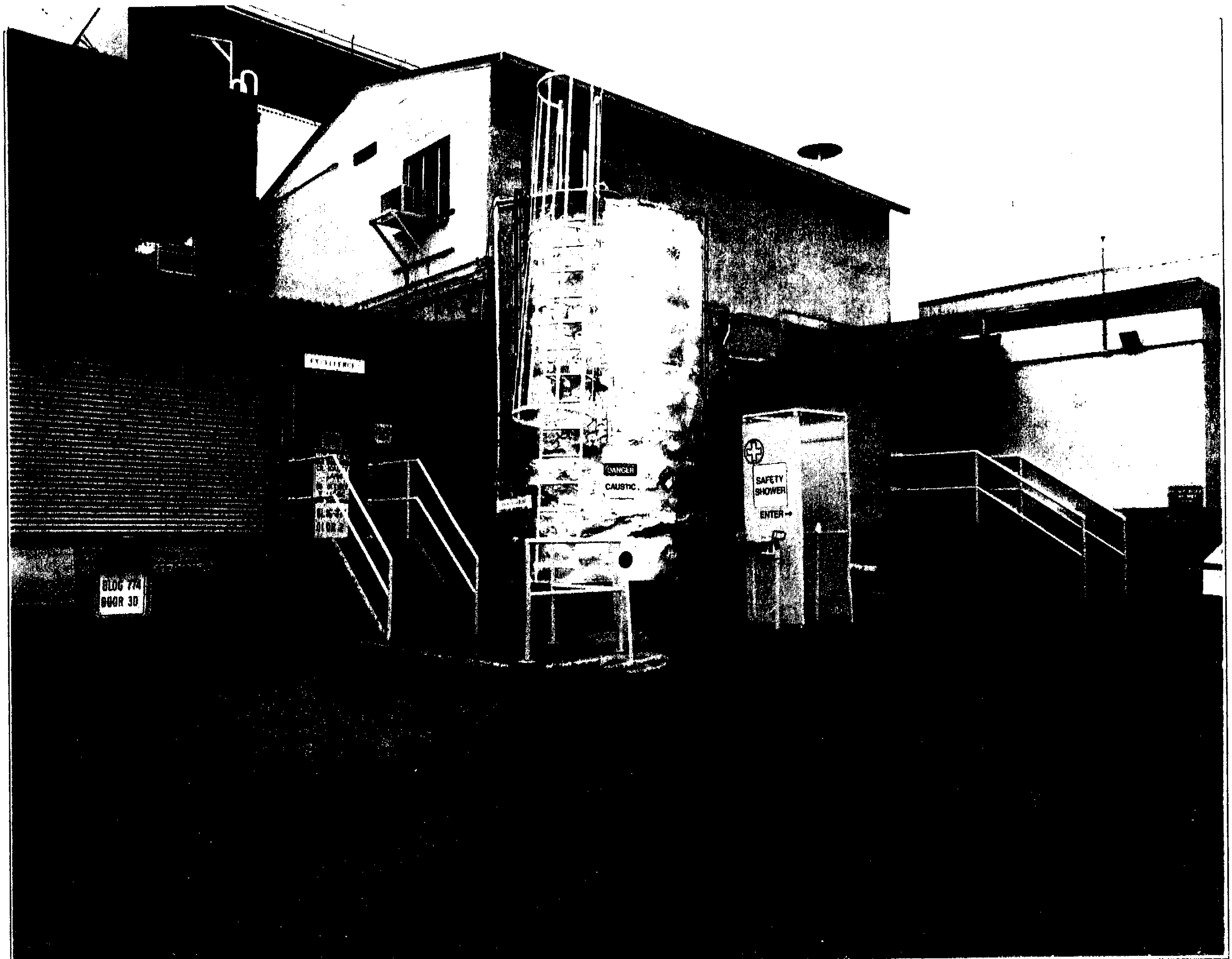


FIGURE 2-8

IHSSs 138 and 150.6/150.8 (partial)

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado



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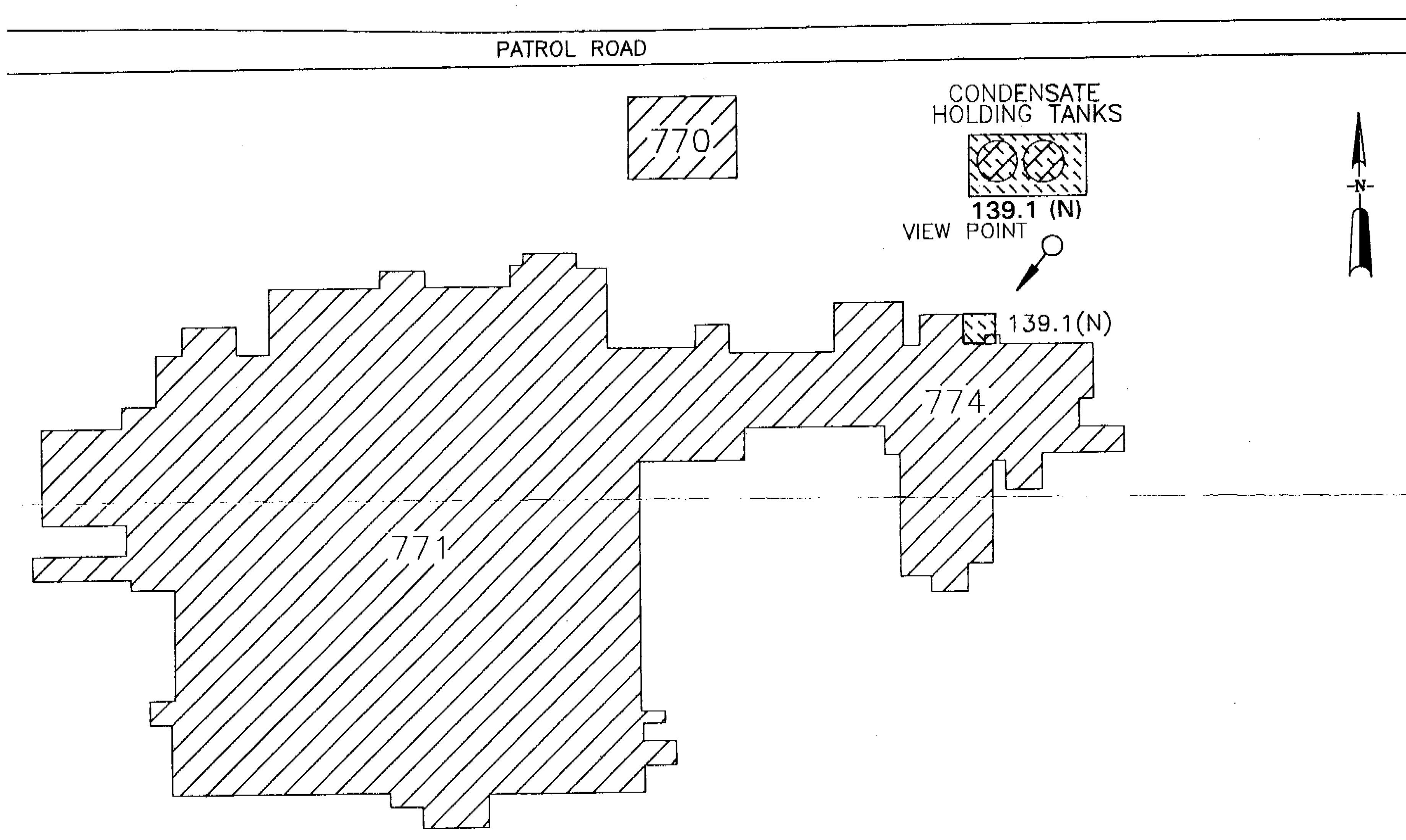

FIGURE 2-9
IHSS 139.1(N)

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

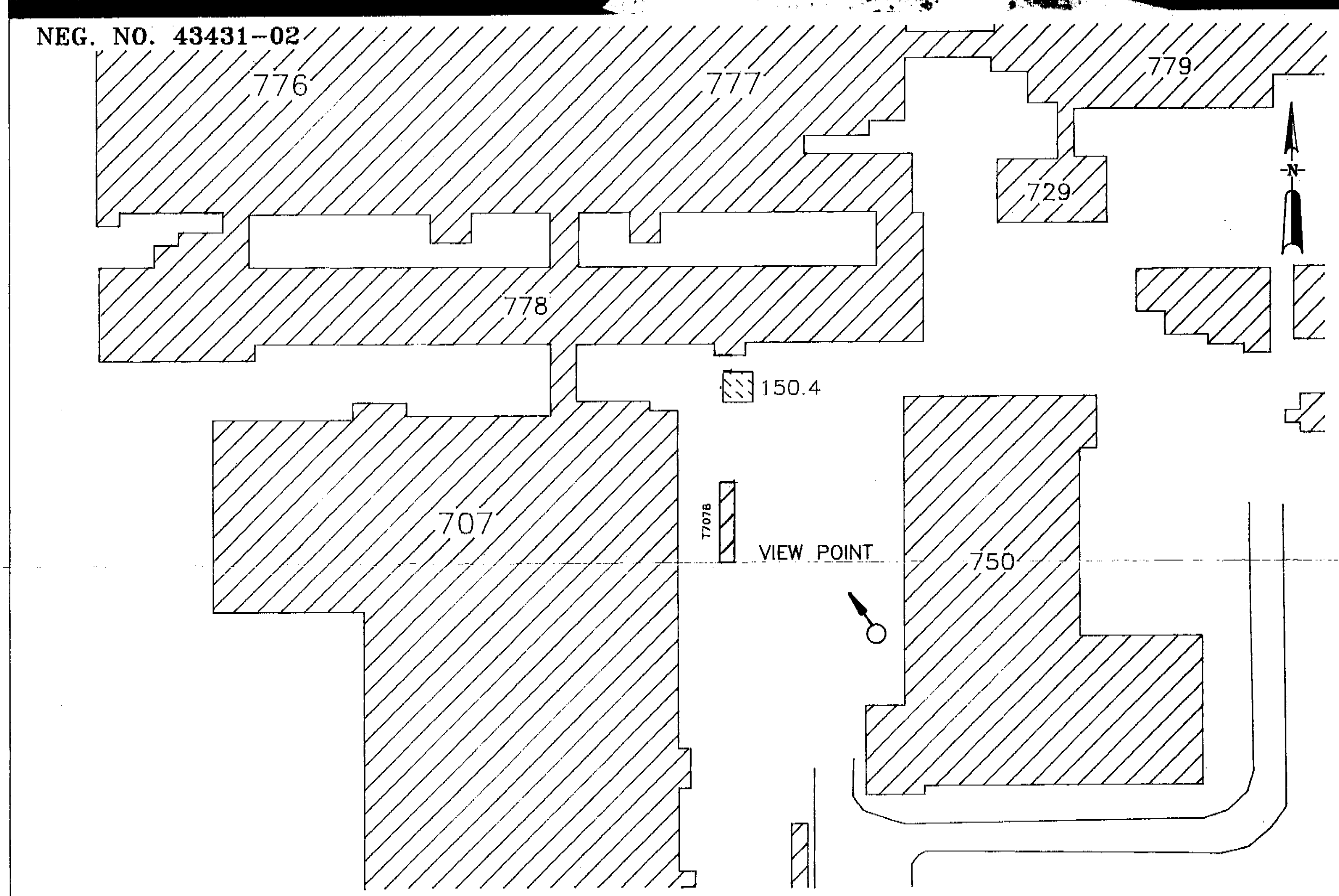

FIGURE 2-17
IHSS 150.4

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

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Rocky Flats Plant, Golden, Colorado

NEG. NO. 43969-04

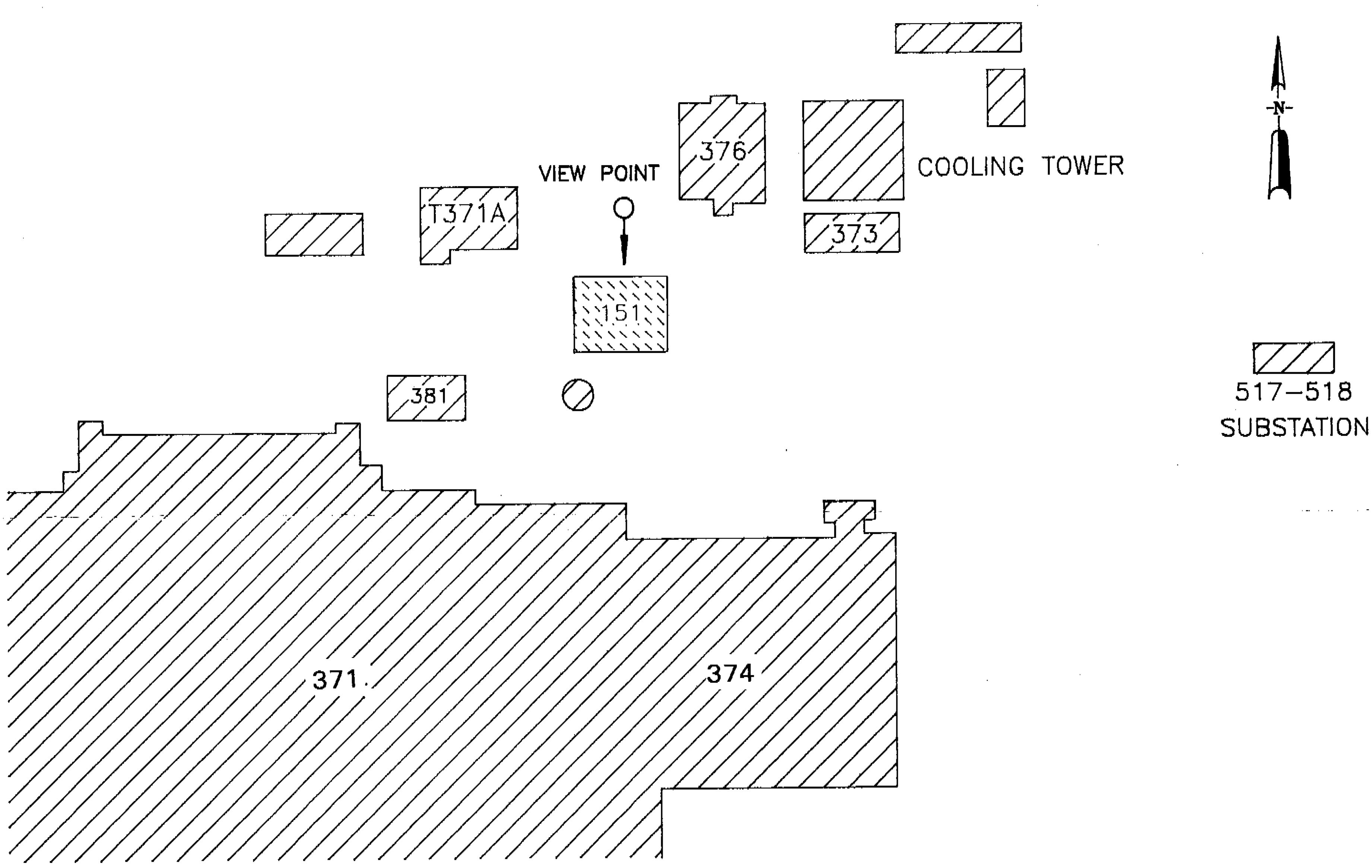


FIGURE 2-21
IHSS 151

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

NEG. NO. 42090-00

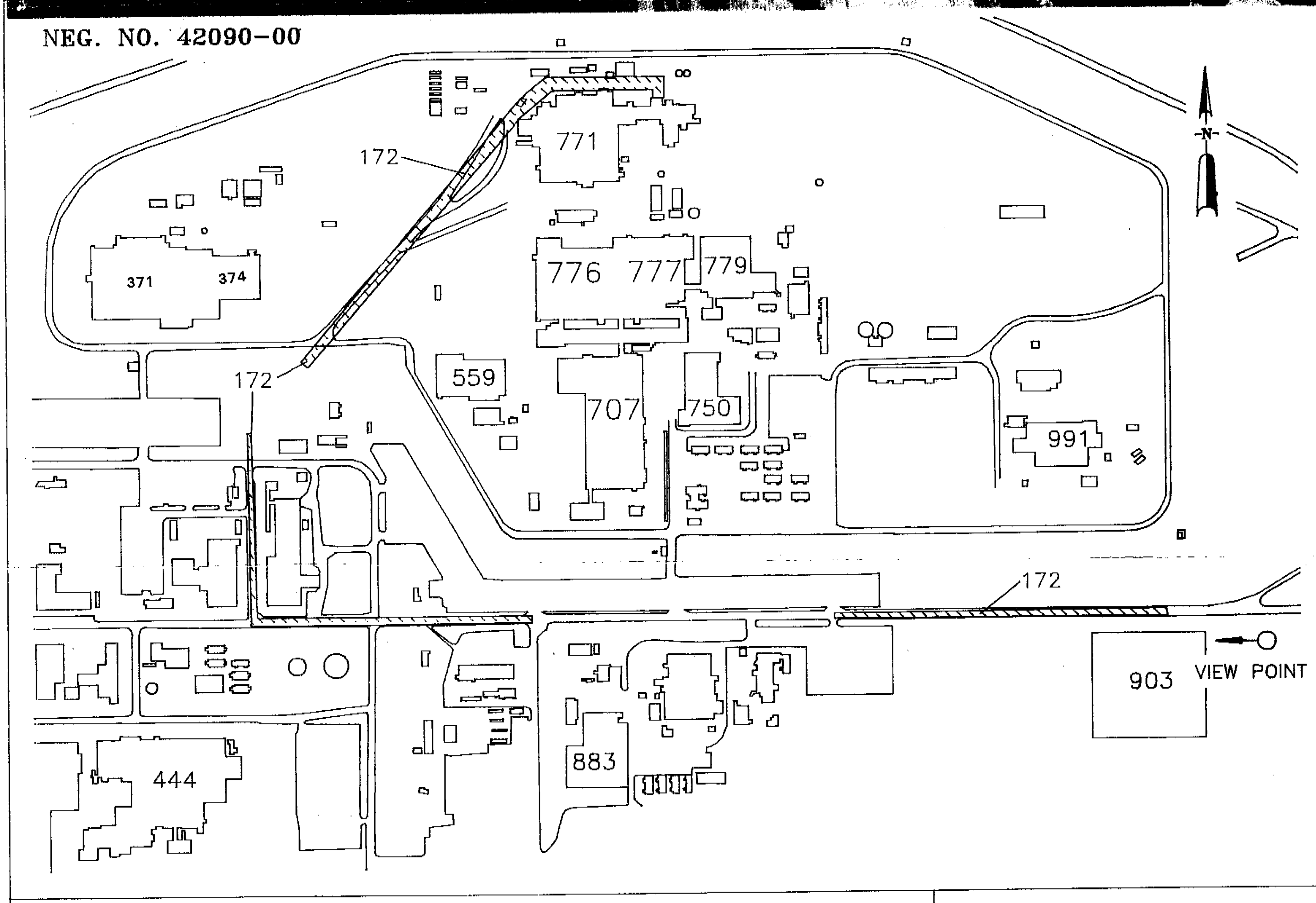


FIGURE 2-24

IHSS 172

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

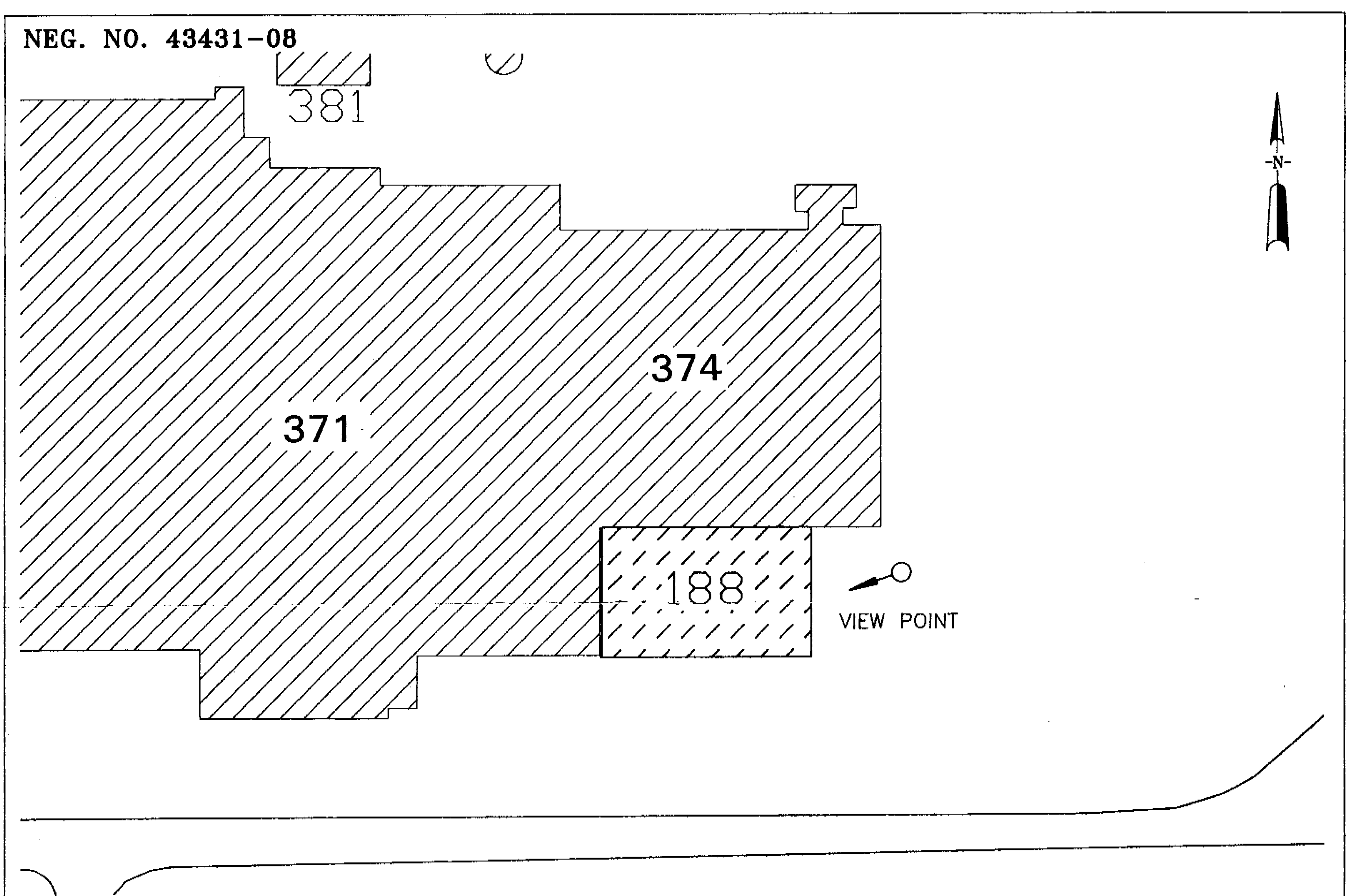
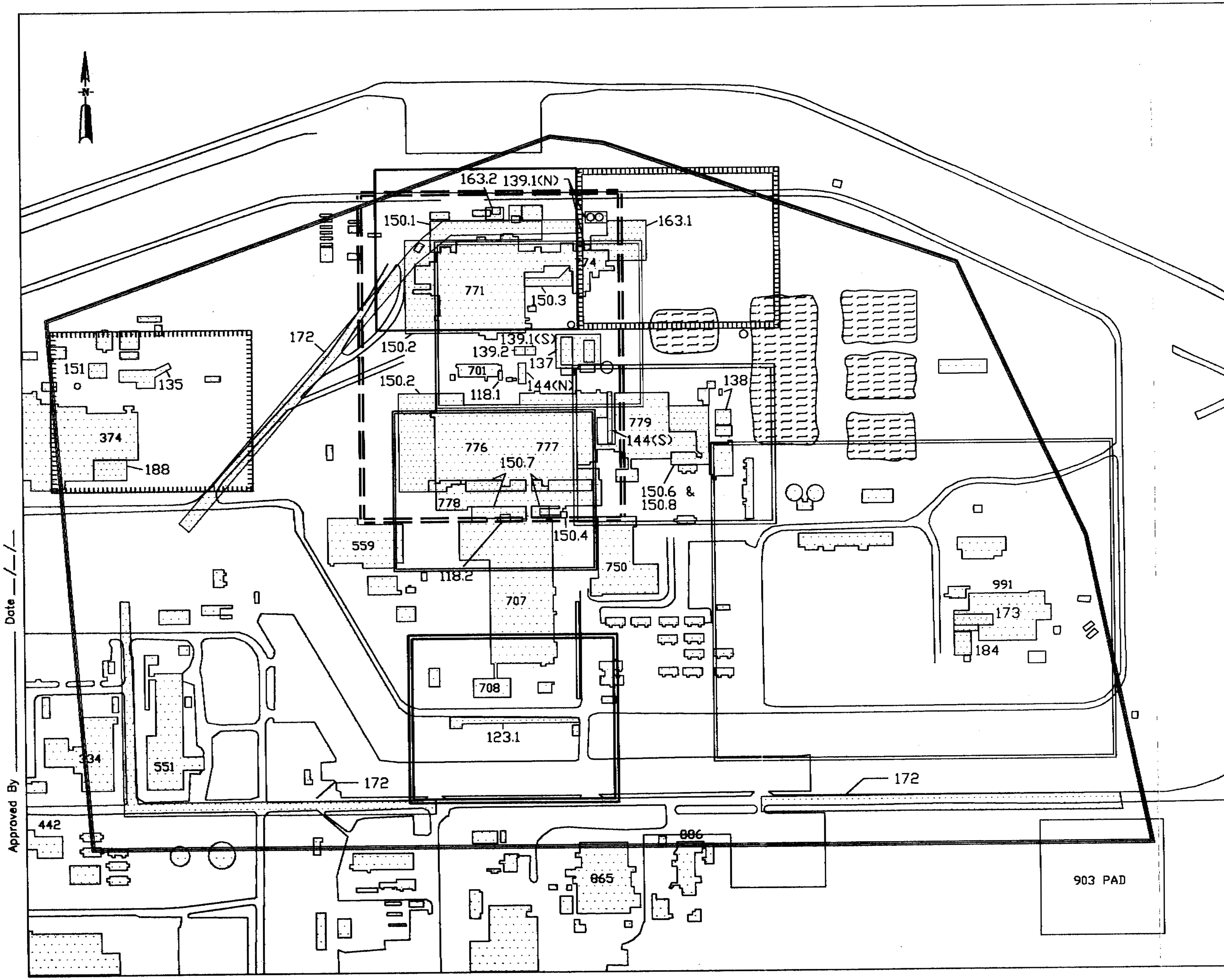


FIGURE 2-26
IHSSs 188

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado



File Name: OU86-4.DWG

MAP LEGEND

- ROADWAYS
- 991 BUILDINGS AND NUMBERS
- 137 INDIVIDUAL HAZARDOUS SUBSTANCE SITES (IHSS) AND NUMBERS
- EVAPORATION PONDS
- OU8 BOUNDARY

INDEX TO IHSS LOCATION MAPS

- FIGURE 6-5
- FIGURE 6-6
- FIGURE 6-7
- FIGURE 6-8
- FIGURE 6-9
- FIGURE 6-10
- FIGURE 6-11
- FIGURE 6-12
- FIGURE 6-13

SCALE IN FEET

0 300 600

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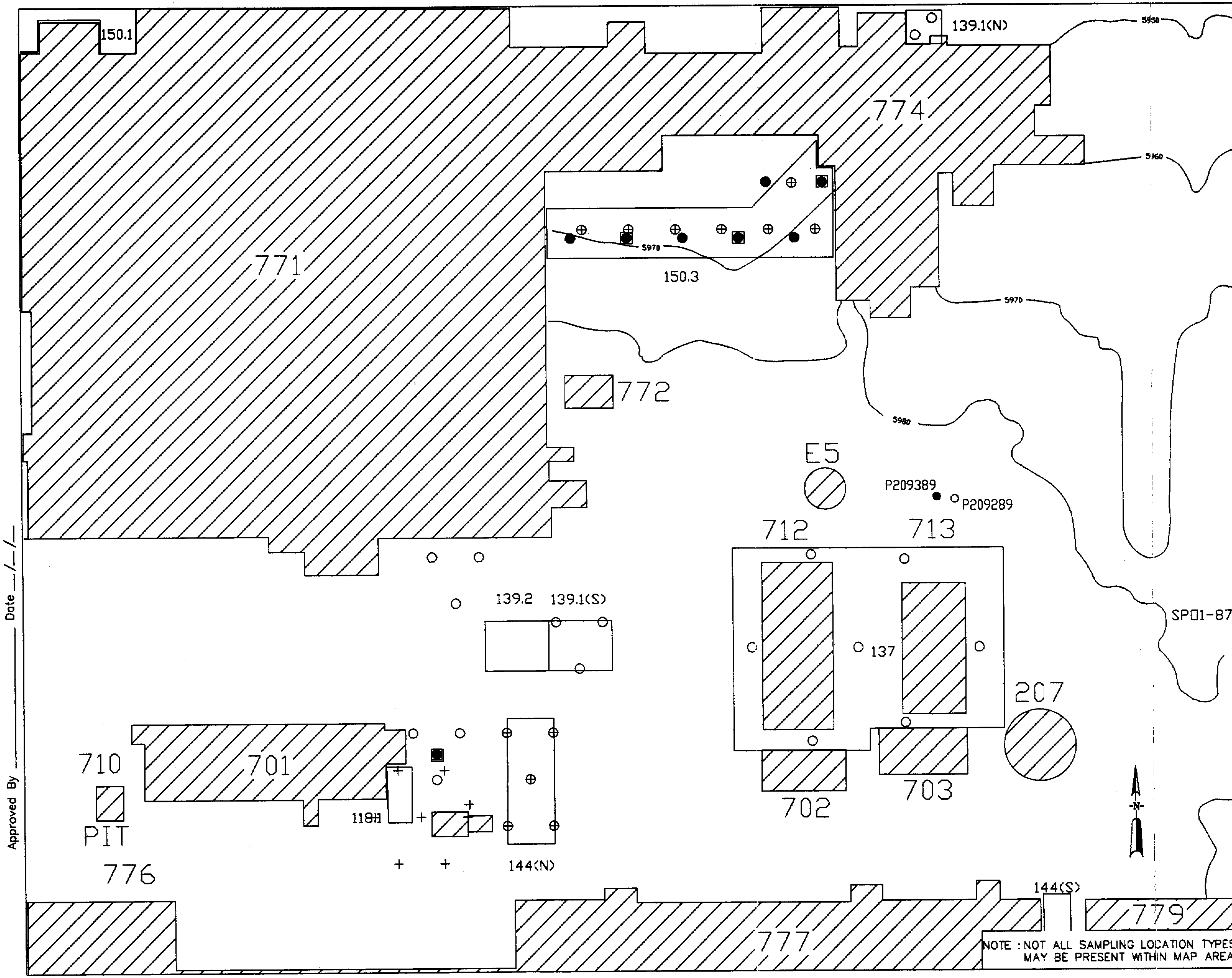
Rocky Flats Plant
Golden Colorado

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

FIGURE 6-4

INDEX MAP TO
FIGURES 6-3 TO 6-13



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MAP LEGEND

ROADWAYS

SURFACE WATER FEATURES

BUILDINGS AND NUMBERS

INDIVIDUAL HAZARDOUS SUBSTANCE SITES AND NUMBERS

EXISTING: SAMPLING LOCATION

SW121 ○ SURFACE WATER SAMPLING

SED124 ○ SURFACE WATER SEDIMENT

P207589 ● BEDROCK WELL

P219589 ○ ALLUVIAL WELL

BH33-87 ⬡ BOREHOLE

560 △ PRE-1986 MONITOR WELL

PROPOSED STAGE 2 SAMPLE LOCATIONS

\+ SOILGAS

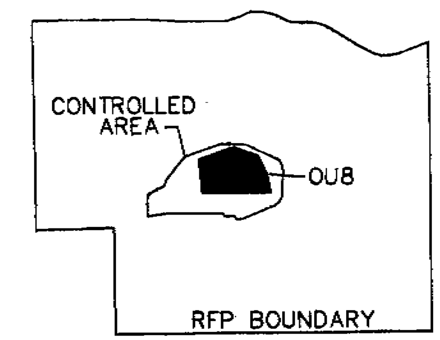
○ SURFICIAL SOIL

● HPGe

□ VERTICAL SOIL PROFILE (ACTUAL LOCATION WILL BE SELECTED IN THE FIELD)

SCALE IN FEET

0 50 100



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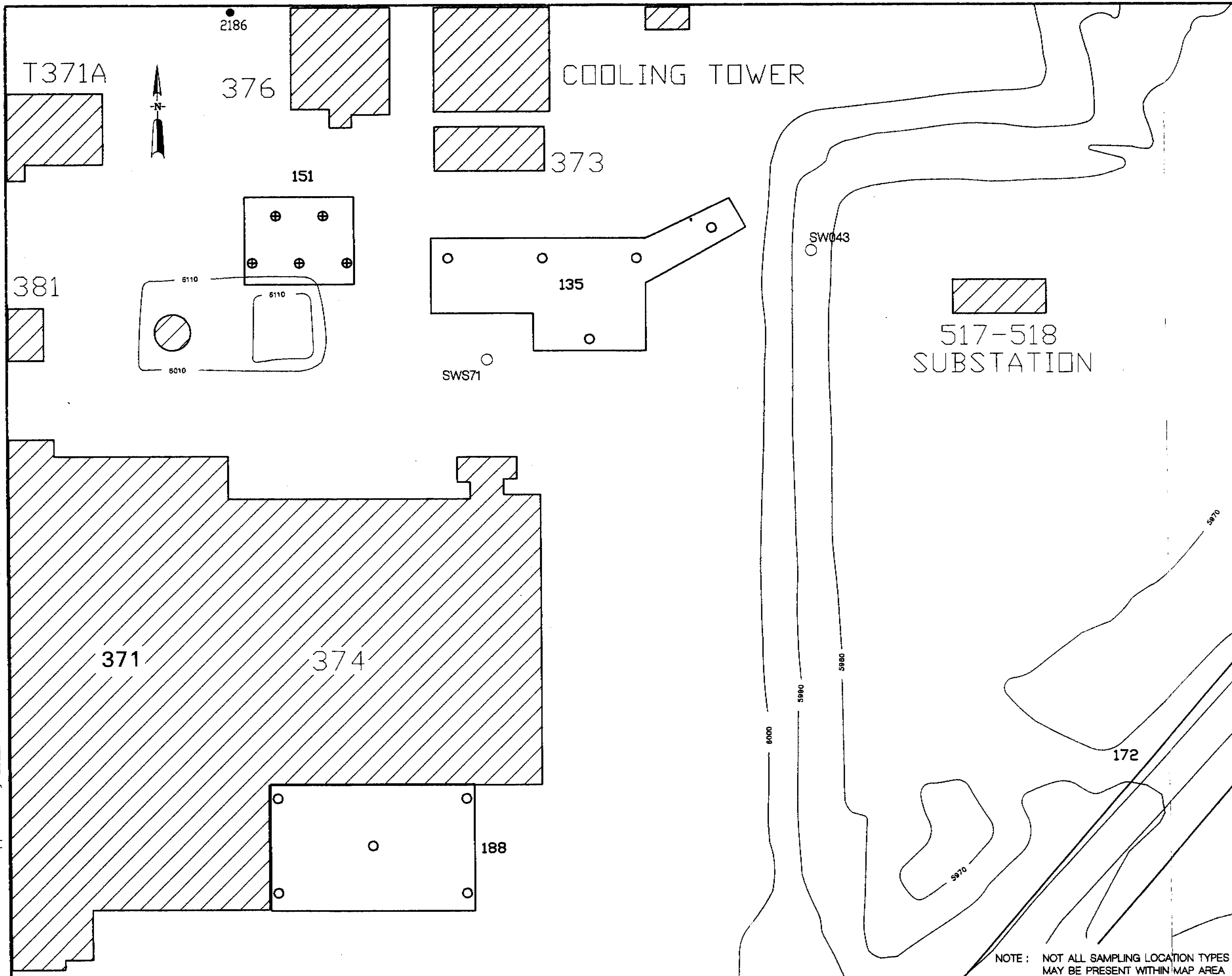
Golden Colorado

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

FIGURE 6-5

PROPOSED SAMPLING LOCATIONS:
IHSS Nos.: 118.1, 137, 139.1(S), 139.2, 144(N), & 150.3

Approved By ________ Date __/__/__



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MAP LEGEND

ROADWAYS

SURFACE WATER FEATURES

BUILDINGS AND NUMBERS

137 INDIVIDUAL HAZARDOUS SUBSTANCE SITES AND NUMBERS

EXISTING SAMPLING LOCATION

SW121 SURFACE WATER SAMPLING

SED124 SURFACE WATER SEDIMENT

P207589 BEDROCK WELL

P219589 ALLUVIAL WELL

BH33-87 BOREHOLE

560 PRE-1986 MONITOR WELL

PROPOSED STAGE 2 SAMPLE LOCATIONS

+ SOILGAS

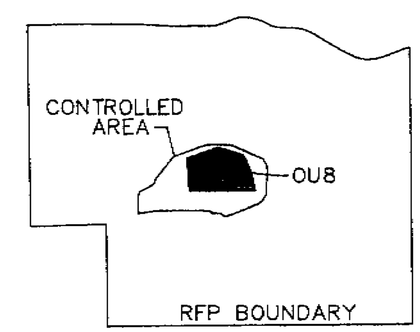
SURFICIAL SOIL

HPGe

VERTICAL SOIL PROFILE (ACTUAL LOCATION WILL BE SELECTED IN THE FIELD)

SCALE IN FEET

0 50 100



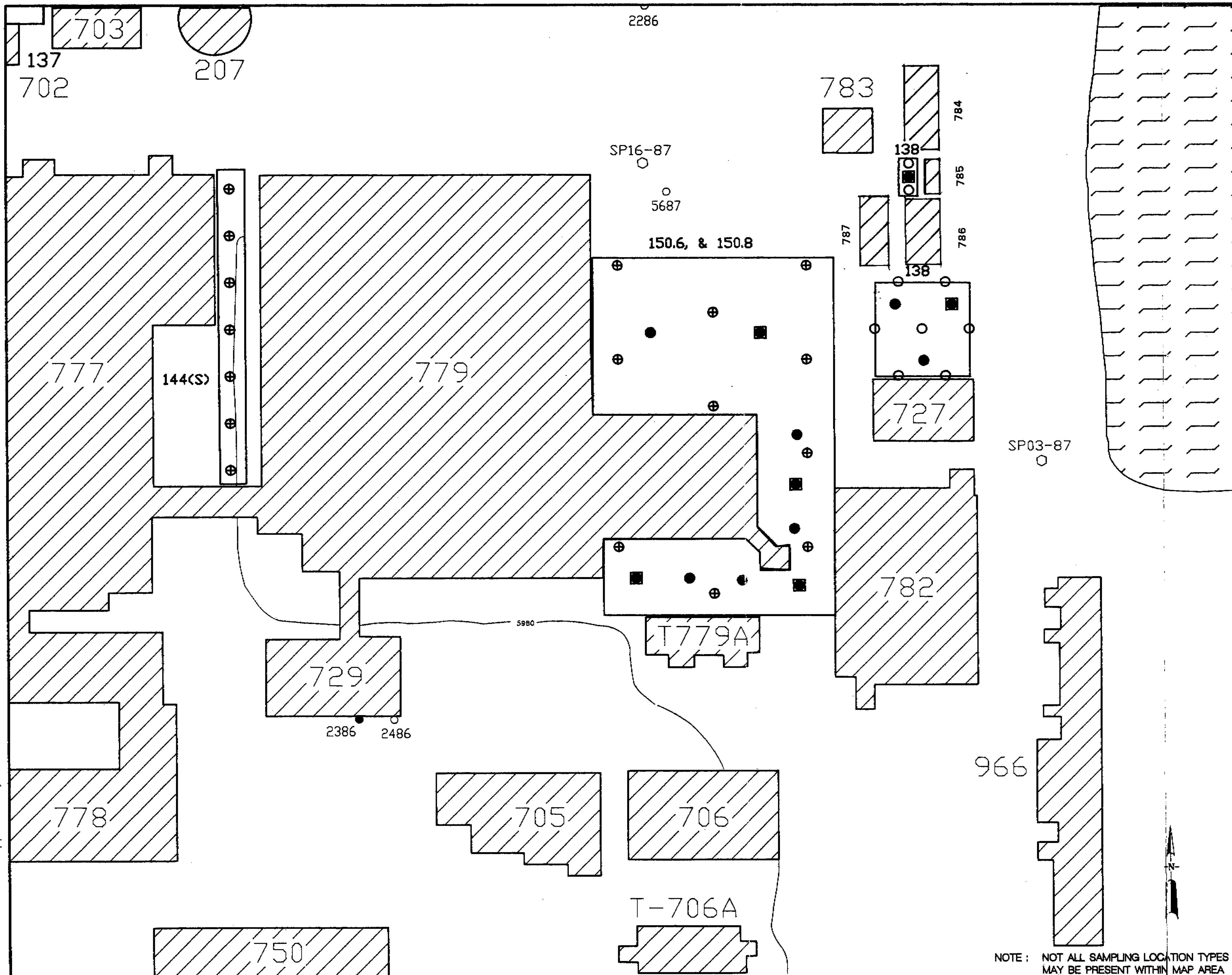
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden Colorado

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

FIGURE 6-8

PROPOSED SAMPLING LOCATIONS:
IHSS Nos.: 135, 151 & 188

Approved By PJJ. Date 11/23/92



NOTE : NOT ALL SAMPLING LOCATION TYPES MAY BE PRESENT WITHIN MAP AREA

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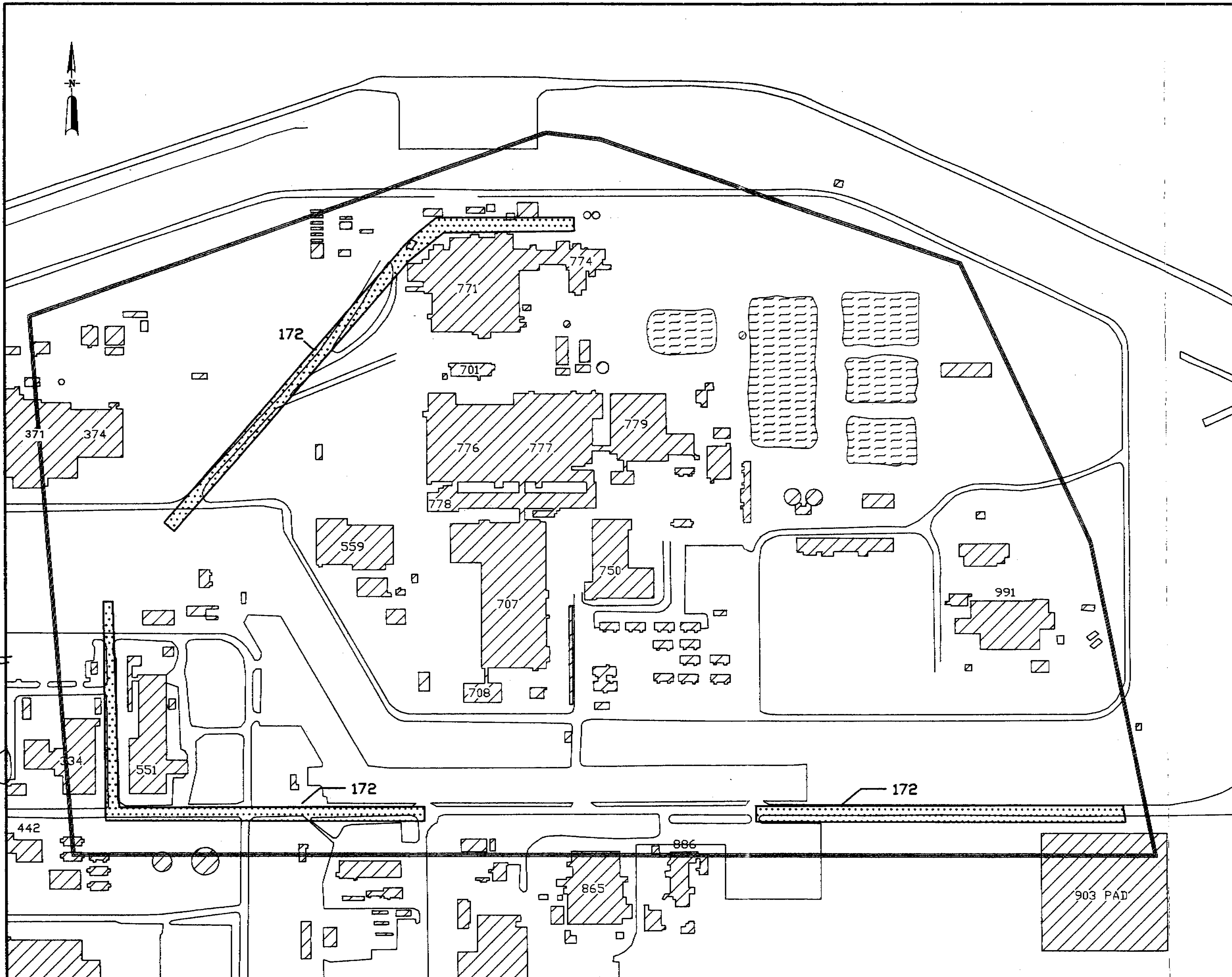
OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

FIGURE 6-9

PROPOSED SAMPLING LOCATIONS:
IHSS Nos.: 138, 144(S),
150.6 & 150.8

Approved By PJJ Date 11/23/92



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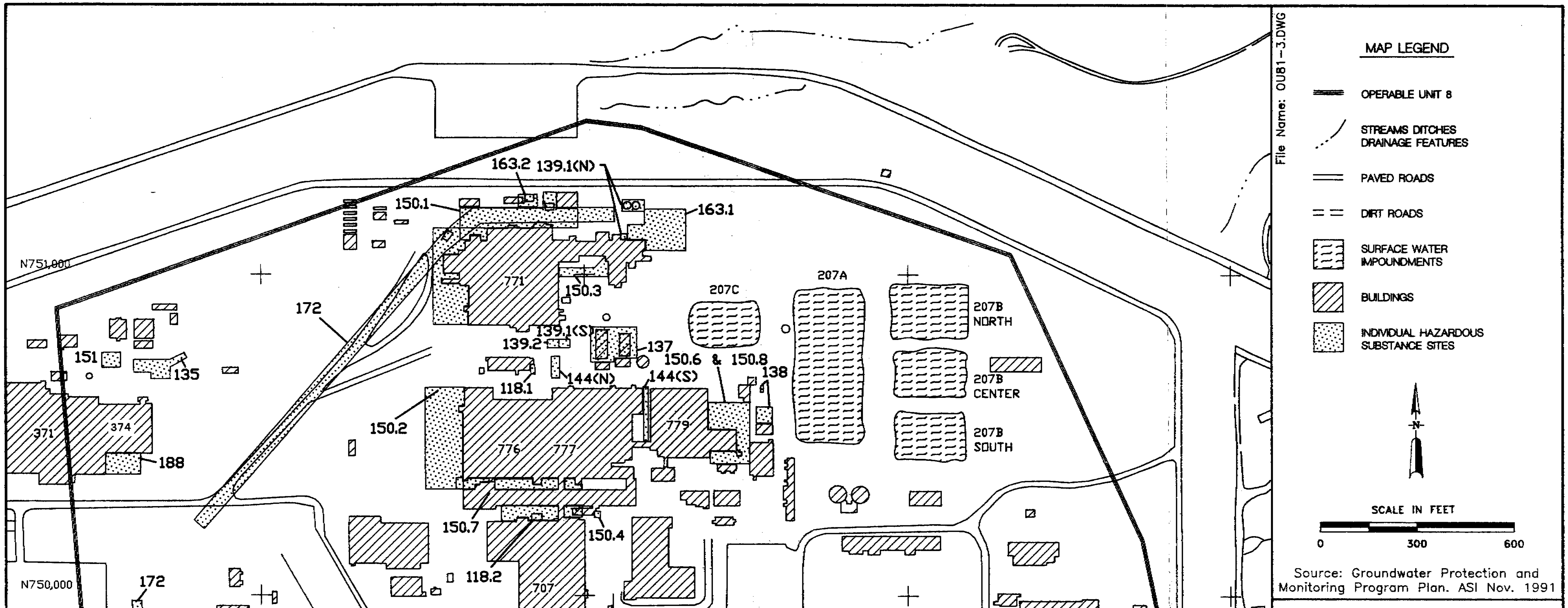
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden Colorado

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

FIGURE 6-14

PROPOSED INVESTIGATION AREA
IHSS No.: 172

Approved By James D. [signature] Date 11/23/92



Source: Groundwater Protection and Monitoring Program Plan. ASI Nov. 1991

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden Colorado

OPERABLE UNIT NO. 8
PHASE I RFI/RI WORK PLAN

FIGURE 8-1

LOCATION OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES OPERABLE UNIT 8 700 AREA

Approved By [signature] Date 11/20/92